

REMARKS

With the foregoing amendments to the specification, Applicant has amended the Related Applications section to include the U.S. patent application numbers of concurrently filed, related applications. Applicant has also amended the specification to address typographical errors noted by the Examiner. See Office Action at 2.

In response to the Office Action mailed November 30, 2006, Applicant respectfully requests reconsideration. Claims 1-48 are pending in the application of which claims 1, 24, 46, 47, 48, and 49, are independent. Applicant gratefully appreciates the Examiner's allowance of claim 49. By this amendment, Applicant amends claims 4-6, 8-10, 19-24, 27-28, 31, 41-45, 47, and 48 to clarify Applicant's invention and to comply with the Examiner's suggested amendments to traverse the rejection under 35 U.S.C. § 112 and the Claim Objections. See Office Action at 2-7. Accordingly, no new matter is introduced by these amendments.

Rejections Under 35 U.S.C. § 101

The Examiner rejected claim 47 under 35 U.S.C. § 101 as being directed to non-statutory subject matter. See Office Action at 3. While Applicant disagrees with the Examiner's conclusion, Applicant has amended claim 47 to read, "A tangibly-embodied computer-readable medium...." Since the claim now excludes non-material or intangible embodiments, the rejection under 35 U.S.C. § 101 should be withdrawn.

Rejections Under 35 U.S.C. § 112

The Examiner rejected claims 5-6, 20-23, 27-28, and 42-45 under 35 U.S.C. § 112 as being indefinite. The Examiner states, with respect to claim 20, that "Parent claim 19 only recites that the third blade is connected to the third communication fabric

and that the fourth blade is connected to the fourth communication fabric.” See Office Action at 5. Applicant maintains that claim 19 does not recite this limitation. Similarly, Applicant disagrees with the Examiner’s statements regarding claims 21-23, 27, and 42-45. See Office Action at 4-7. Although Applicant disagrees with the Examiner’s analysis regarding claims 19, 21-23, 27, and 42-45, to expedite the examination, Applicant has modified all of the claims rejected under 35 U.S.C. § 112 in accordance with the Examiner’s suggestions on pages 4-7 of the Office Action. Accordingly, Applicant requests that the rejection under 35 U.S.C. § 112 be withdrawn.

Rejections Under 35 U.S.C. § 103

The Examiner rejected claims 1, 3-5, 8-10, 13-15, 17, 24, 26-28, 31-32, 35-37, 39, and 47-48 under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,140,592 (“Idleman”) in view of U.S. Patent No. 5,504,882 (“Chai”). The Examiner also rejected claims 6-7, 11-12, 19-23, 29-30, 33-34, and 41-46 under 35 U.S.C. 103(a) as being unpatentable over Idleman in view of Chai and in further view of U.S. Patent No. 4,607,365 (“Greig”). Additionally, the Examiner rejected claims 2, 16, 18, 25, 38, and 40 under 35 U.S.C. 103(a) as being unpatentable over Idleman in view of Chai and U.S. Patent No. 7,111,189 (“Sicola”). Applicant maintains that Idleman does not disclose, teach, or suggest all of the elements of Applicant’s claims and neither Chai nor Greig nor Sicola make up for the deficiencies of Idleman. The Examiner has therefore failed to present a *prima facie* case of obviousness. See MPEP § 2143.03 (“To establish a *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art.”).

35 U.S.C. 103(a): Idleman in view of Chai - Independent claims 1, 24, and 47-48 and dependant claims 3-5, 8-10, 13-15, 17, 26-28, 31-32, 35-37, and 39

Neither Idleman nor Chai, alone or in combination, disclose, teach, or suggest the storage processors of Applicant's independent claims. For example, Idleman does not disclose or suggest, "a first set of storage processors having access to the host system and maintaining virtual volume objects reflecting a logical configuration of the virtual volume," and "a second set of storage processors having access to the storage devices and maintaining virtual volume objects associated with logical partitions of the virtual volume data," as recited in claim 1. The Examiner concedes as much, stating that Idleman "does not expressly disclose the system wherein the first set of controllers maintain virtual volume objects reflecting a logical partition." See Office Action at 10.

Applicant maintains that not only does Idleman not disclose or suggest "a first set of storage processors...," but Idleman does not disclose or suggest "a second set of processors having access to the storage devices and maintaining virtual volume objects associated with logical partitions of the virtual volume data." In Applicant's claim 1, the first set of storage processors maintains virtual volume objects reflecting the **logical configuration** of the virtual volume. The logical configuration would include information regarding the striping, mirroring, etc. of the virtual volume. See Applicant's specification at paragraph 075 and FIG. 6. In Applicant's claim 1, the second set of storage processors maintains virtual volume objects reflecting the **logical partitions** of the virtual volume data. Id. Idleman indeed discloses a virtualization system with two sets of storage controllers, however, Idleman does not disclose details about how the virtualization is accomplished within these processors.

Applicant's architecture cannot be implied simply from Idleman's having multiple controllers since there exists a likely alternative reason for having multiple controllers or processors. One alternative reason is that separating the control into first-level and second-level controllers isolates the host computer from a failover operation. See Sicola at Col. 2 lines 22-25. Coincidentally, Sicola presents this as the reason for Idleman's architecture, referencing U.S. Patent No. 5,274,645, which is a continuation-in-part of Idleman '592 cited by Examiner.

Chai does not make up for this deficiency of Idleman. Chai indeed discloses a processor connected with the host and connected with processors connected to the storage devices. However, Chai's sets of processors are not organized into a first set of processors maintaining virtual volume objects reflecting the logical configuration of the virtual volume and a second set of processors maintaining virtual volume objects reflecting the logical partitions of the virtual volume data. Both sets of processors in Chai perform a RAID configuration that would require logical configuration information in each set. For example, Chai's processor connected with the host is disclosed to perform RAID 1 and would therefore contain information regarding mirroring (which constitutes logical configuration information). See Chai at FIG. 4. Chai's processors connected with the storage devices are disclosed to perform RAID 5 and would therefore contain information regarding striping (which also constitutes logical configuration information). See Chai at FIG. 4; Col. 5 lines 26-29; and Col. 5 lines 54-58. This is unlike Applicant's claim 1, where the set of storage processors connected with the host would maintain virtual volume objects reflecting the logical configuration, including both the striping and the mirroring, and the set of storage processors

connected to the storage devices would separately maintain virtual volume objects reflecting the logical partitioning information. See Applicant's specification at paragraph 075 and FIG. 6.

Since neither Idleman nor Chai disclose or suggest "a first set of storage processors having access to the host system and maintaining virtual volume objects reflecting a logical configuration of the virtual volume," and "a second set of storage processors having access to the storage devices and maintaining virtual volume objects associated with logical partitions of the virtual volume data," Idleman and Chai are not combinable to disclose or suggest every element of Applicant's claim 1.

Independent claims 24 and 47-48 recite limitations similar to Applicant's claim 1, being directed to maintaining virtual volume objects associated with logical partitions of the virtual volume data separate from virtual volume objects reflecting a logical configuration of the virtual volume. For at least the reason stated above with respect to claim 1, claims 24, and 47-48 are allowable under 35 U.S.C. § 103. Dependant claims , 3-5, 8-10, 13-15, 17, 26-28, 31-32, 35-37, and 39 are allowable under 35 U.S.C. § 103 at least since they depend from claims 1 and 24.

35 U.S.C. 103(a):

- Idleman in view of Chai and in further view of Greig: Claims 6-7, 11-12, 19-23, 29-30, 33-34, and 41-46
- Idleman in view of Chai and in further view of Sicola: Claims 2, 16, 18, 25, 38, and 40

Turning now to the above identified obviousness rejections based on Idleman, Chai, Greig and Sicola, none of the references relied upon by the Examiner for these

rejections set forth above disclose, teach or suggest limitations recited in independent claims 1 and 24, the independent claims from which all of the dependent claims rejected as set forth above depend, nor do they teach or suggest limitations recited in independent Claim 46. Specifically, as shown above, neither Idelman nor Chai disclose, teach, or suggest maintaining virtual volume objects associated with logical partitions of the virtual volume data separately from virtual volume objects reflecting a logical configuration of the virtual volume. In addition, neither Greig nor Sicola disclose, teach, or suggest these limitations of Applicant's claims 1, 24, and 46.

Greig provides multiple processors so that "if a processor malfunctions, another can take its place." See Greig at Col. 1; lines 36-38. Greig does not disclose or suggest *any* method of virtualization using the redundant processors. Therefore, Greig does not disclose, teach, or suggest maintaining virtual volume objects associated with logical configuration separate from virtual volume objects associated with logical partitioning. For at least this reason, Greig does not disclose, teach, or suggest the limitations of Applicant's claim 1 (nor claims 6-7, 11-12, 19-23, 29-30, 33-34, and 41-45 depending therefrom) nor Claim 46.

Sicola also has multiple processors. However, their function is to maintain a replicated virtual volume and to allow access to the replicated virtual volume through the redundant processors. See Sicola at Abstract, FIG. 2, and FIG. 4. Therefore, since each of the multiple processors of Sicola independently perform the virtualization, each would contain both information regarding logical configuration and logical partitioning. Sicola does not disclose, teach, or suggest maintaining virtual volume objects associated with logical configuration separate from virtual volume objects associated

with logical partitioning. Sicola, therefore, does not disclose, teach, or suggest the limitations of Applicant's claim 1 (nor 2, 16, 18, 25, 38, and 40 depending therefrom).

Therefore, since none of the references relied upon by the Examiner for the rejections set forth above disclose, teach or suggest limitations recited in independent claims 1 and 24 (the independent claims from which claims 2, 6-7, 11-12, 16, 18-23, 25, 29-30, 33-34, 38, and 40-45 depend) nor recited in independent claim 46, claims 2, 6-7, 11-12, 16, 18-23, 25, 29-30, 33-34, 38, and 40-46 are allowable under 35 U.S.C. § 103.

In view of the foregoing amendments to claims and remarks, Applicants respectfully request the reconsideration and reexamination of this application and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

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